

## Amendments to the Claims

The claims are amended as follows:

1. (canceled)
2. (currently amended) The apparatus of claim [1] 4, wherein the sensor modules comprise one or more micro-machined sensor elements.
3. (currently amended) ~~An apparatus for acquiring seismic data, comprising:~~  
~~one or more sensor modules adapted to sense seismic energy; and~~  
~~one or more seismic recorders coupled to the sensor module adapted to record~~  
~~seismic data indicative of seismic energy;~~  
~~wherein the sensor module comprises one or more accelerometers, and~~  
~~wherein the accelerometers have one or more axes of sensitivity~~ The apparatus of  
claim 4, wherein the sensor module further comprises a global positioning system receiver adapted to synchronize the operation of the sensors for synchronizing the operation of a sensor to a common time.
4. (currently amended) ~~The apparatus of claim 1 further~~ An apparatus for acquiring seismic data, comprising:  
one or more sensor modules adapted to sense seismic energy, wherein the one or  
more sensor modules comprise one or more force feedback controlled  
accelerometers, wherein the accelerometers have one or more axes of sensitivity;  
one or more seismic recorders coupled to the one or more sensor modules adapted  
to record seismic data indicative of seismic energy;  
a feedback control circuit adapted to provide force balanced feedback coupled to the sensor and for providing insensitivity to tilt; and  
a controller adapted to monitor the operation of the apparatus coupled to the sensor.

5. (currently amended) The apparatus of claim [1] 4, further comprising:  
— ~~a controller coupled to the sensor module for controlling the operation of the apparatus;~~  
— wherein the sensor module comprises a 3-axis magnetometer for determining the orientation of the sensor module.
6. (previously presented) An apparatus for acquiring seismic data, comprising:  
one or more sensor modules adapted to sense seismic energy;  
one or more seismic recorders coupled to the sensor module adapted to record seismic data indicative of seismic energy;  
wherein the sensor module comprises one or more accelerometers, and  
wherein the accelerometers have one or more axes of sensitivity;  
a crystal assembly coupled to the sensor module for providing a force in order to measure the ground coupling and vector fidelity of the sensor; and  
a controller coupled to the sensor module for controlling the operation of the apparatus.
7. (currently amended) The apparatus of claim [1] 4, wherein the sensor module provides a digital output signal.
8. (currently amended) The apparatus of claim [1] 4, wherein the one or more seismic recorders are radio seismic recorders.
9. (original) The apparatus of claim 8, wherein the radio seismic recorders are integral to the sensor modules.
10. (canceled)
11. (currently amended) A method of acquiring seismic data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more force feedback controlled accelerometers;

recording seismic data indicative of the seismic energy using a seismic recorder;  
and The method of claim 10 further comprising  
using the force feedback controlled accelerometer for providing insensitivity to tilt.

12. (previously presented) The method of claim 11 further comprising determining a tilt angle of the sensor module; and  
measuring the steady-state gravity field over a predetermined time period.
13. (original) The method of claim 11 further comprising:  
calibrating the sensor module to determine tilt information;  
storing the tilt information within the sensor module; and  
measuring an effect of gravity on the sensor module.
14. (currently amended) The method of claim 10 11, wherein the sensor module comprises a 3-axis sensor, the method further comprising:  
determining the orientation of the 3-axis sensor, comprising:  
performing a 3-dimensional measurement of a gravity field;  
determining a gravity vector;  
performing a 3-dimensional measurement of a magnetic field;  
determining a magnetic vector; and  
determining the direction of magnetic north and gravity down.
15. (currently amended) A method of acquiring seismic data comprising:  
~~sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more accelerometers;~~  
~~recording seismic data indicative of the seismic energy using a seismic recorder;~~  
and The method of claim 11 further comprising:  
synchronizing the operation of the seismic sensor module;  
wherein synchronizing the operation of a seismic sensor module  
comprises using a global positioning system signal from a global positioning system receiver within the sensor module.

16. (currently amended) The method of claim 10 11 further comprising:  
determining the position of the seismic sensor;  
wherein determining the position of the seismic sensor comprises using  
a global positioning system signal from a global positioning system receiver  
within the sensor module.

17. (currently amended) ~~The method of claim 10 further~~ A method of acquiring seismic data comprising:  
~~sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more force feedback controlled accelerometers;~~  
~~recording seismic data indicative of the seismic energy using a seismic recorder;~~  
and  
synchronizing seismic data acquisition by receiving a signal containing time information; and  
controlling the operation of the one or more accelerometers and the one or more seismic recorders using the signal.

18. (currently amended) ~~A method of acquiring seismic data comprising:~~  
~~—sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more accelerometers;~~  
~~—recording seismic data indicative of the seismic energy using a seismic recorder;~~  
and The method of claim 11 further comprising:  
determining the degree of coupling between the sensor module and the ground, by generating a force;  
recording a response of the sensor assembly to the force; and  
analyzing the response.

19. (currently amended) The method of claim 10 11 further comprising:  
determining the vector fidelity of the sensor module comprising:  
generating a force;  
recording a response of the sensor assembly to the force; and

analyzing the response.

20. (currently amended) The method of claim 10 11 further comprising:  
determining the orientation of the sensor module, comprising:  
generating a force at a plurality of source points;  
recording a response of the sensor module to the force; and  
analyzing the response.
21. (currently amended) ~~The method of claim 10 further~~ A method of acquiring seismic data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more force feedback controlled accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
and  
determining the state-of-health of the sensor module, comprising:  
sending a bitstream to the sensor module;  
decoding, capturing, and looping-back the bitstream to the seismic recorder; and  
capturing and analyzing the bitstream by the seismic recorder,  
wherein analyzing the bitstream comprises determining a malfunction  
of the sensor module.
22. (original) The method of claim 21, wherein determining the state-of-health includes  
using an ASIC coupled to a seismic recorder.
23. (previously presented) A method of acquiring seismic data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
determining the state-of-health of the sensor module, comprising:  
sending a bitstream to the sensor module;  
decoding, capturing, and looping-back the bitstream to the seismic recorder; and

capturing and analyzing the bitstream by the seismic recorder,  
wherein analyzing the bitstream comprises determining a malfunction  
of the sensor module,  
wherein determining the state-of-health includes using an ASIC coupled to a  
seismic recorder; and  
validating the contents of the ASIC.

24. (original)The method of claim 21 further comprising:  
operating the accelerometer; and  
monitoring the operation of the accelerometer;  
wherein monitoring the operation of the accelerometer comprises  
monitoring the accelerometer for instability to indicate a malfunction of the  
accelerometer or an excessive external acceleration.
25. (currently amended)A method of acquiring seismic data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more  
sensor modules comprise one or more force feedback controlled accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
and ~~The method of claim 10 further comprising :~~  
determining the state-of-health for the sensor module comprising:  
exciting the accelerometer with a bitstream; and  
acquiring, analyzing and judging an output signal generated by the  
accelerometer;  
wherein judging an output signal comprises judging a magnitude of  
the output signal to indicate a malfunction of the accelerometer.
26. (original)The method of claim 25, wherein judging an output signal comprises  
judging a phase response of the output signal to indicate a malfunction of the  
accelerometer.
27. (previously presented)A method of acquiring seismic data comprising:

sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
and  
determining the state-of-health for the sensor module comprising:  
exciting the accelerometer with a bitstream; and  
acquiring, analyzing and judging an output signal generated by the accelerometer;  
wherein judging an output signal comprises judging a magnitude of the output signal to indicate a malfunction of the accelerometer;  
wherein judging an output signal comprises judging a total harmonic distortion of the output signal to indicate a malfunction of the accelerometer.

28. (currently amended) ~~The method of claim 10 further~~ A method of acquiring seismic data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more force feedback controlled accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
and  
determining the state-of-health for the sensor module comprising:  
operating the accelerometer for a period of time; and analyzing an output signal generated by the accelerometer;  
wherein analyzing an output signal comprises detecting an excessive root-mean-square amplitude response of the output signal to indicate a malfunction of the accelerometer or a noisy environment.
29. (currently amended) ~~The method of claim 10 further~~ A method of acquiring seismic data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more force feedback controlled accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;

and

determining the state-of-health for the sensor module comprising:  
operating the accelerometer; and  
analyzing an output signal generated by the accelerometer;  
wherein analyzing an output signal comprises analyzing an offset and a  
gravity cancellation magnitude of the output signal to detect a change in the  
inclination of the accelerometer.

30. (currently amended) ~~The method of claim 10 further~~ A method of acquiring seismic data comprising:

sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more force feedback controlled accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;

and

determining the state-of-health for the sensor module comprising:  
operating the accelerometers; and  
monitoring one or more output signals generated by the accelerometers;  
wherein monitoring one or more output signals generated by the  
accelerometers comprises monitoring a vector sum of the self-measured  
coefficients of gravity of the output signals to detect a malfunction of the  
sensor assembly.

31. (previously presented) A method of acquiring seismic data comprising:

sensing seismic energy with one or more sensor modules, wherein the one or more sensor modules comprise one or more accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
and

determining the state-of-health for the sensor module comprising:  
operating the accelerometers;  
driving two of the accelerometers at a reference frequency;  
monitoring an output signal generated by the undriven accelerometer; and

rotating through all the accelerometers;  
wherein monitoring an output signal comprises monitoring the  
magnitude of the reference frequency in the output signal  
of the undriven accelerometer to detect a malfunction of the sensor  
assembly.

32. (previously presented) A method of acquiring seismic data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more  
sensor modules comprise one or more accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
and  
determining the state-of-health for the sensor module comprising:  
operating the accelerometers for a period of time;  
removing DC offset from one or more output signals generated by the  
accelerometer to produce one or more resulting signals;  
transforming the resulting signals from the accelerometers from Cartesian  
coordinates into polar coordinates; and  
analyzing the polar coordinates;  
wherein analyzing the polar coordinates comprises analyzing one or  
more peak and root-mean-square amplitude results to indicate a malfunction  
of the sensor assembly or a noisy acquisition environment.

33. (currently amended) ~~The method of claim 10 further~~ A method of acquiring seismic  
data comprising:  
sensing seismic energy with one or more sensor modules, wherein the one or more  
sensor modules comprise one or more force feedback controlled accelerometers;  
recording seismic data indicative of the seismic energy using a seismic recorder;  
and  
determining the state-of-health for the sensor module comprising:  
(a) operating the accelerometers;  
(b) monitoring one or more output signals generated by the

accelerometers;

(c) analyzing the output signals;

(d) changing the orientation of the sensor assembly; and

(e) repeating (b), (c) and (d) for a plurality of orientations;

wherein analyzing the output signals comprise calculating the sensor's angles with respect to gravity from a vector sum of the self-measured coefficients of gravity in any orientation; and

wherein analyzing the output signals further comprises analyzing the sensor's angles with respect to gravity to indicate a malfunction of the sensor assembly.

34. (canceled)

35. (canceled)

36. (previously presented) A method of calibrating a sensor assembly having a plurality of axes of sensitivity, the method comprising;  
determining a gravity effect on the sensor assembly for each axis of sensitivity;  
and calibrating the sensor assembly with respect to gravity.

37. (previously presented) A method of acquiring seismic information comprising:  
providing a seismic sensor having a plurality of axes of sensitivity;  
calibrating each axis of sensitivity with respect to a gravity effect to provide a calibrated sensor; and  
sensing seismic energy with the calibrated sensor.